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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/689,001
Filing Date: October 20, 2003
Appellant(s): VYAS ET AL.

Harness, Dickey & Pierce, P.L.C.
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 07/13/09 appealing from the Office action mailed 03/09/09.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5,624,769	Li et al	04-1997
4,146,657	Gordon	03-1979
7,005,205	Gyoten et al	02-2006

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Appellant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1-3, 13-15, 18-22 and 55-58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al 5624769 in view of Gordon 4146657.

The present application is aimed at an electrochemical cell wherein the disclosed inventive concept is a the specific metal oxide coating applied to an electrically conductive contact element.

Concerning claims 1 and 55:

Li et al disclose a PEM (proton exchange membrane) fuel cell (Abstract) comprising a membrane electrode assembly (reference numeral 4, 6) comprising a solid polymer membrane

electrolyte having an anode on one face of the membrane electrolyte and a cathode on the opposite side thereof; the membrane electrode assembly being sandwiched between a pair of electrically conductive elements (bipolar septum/plate 8, or end contact plates 14, 16) serving as current collectors for the anode/cathode and containing appropriate channels and openings therein for distributing the gaseous reactants (i.e. hydrogen and oxidant-air) over the surfaces of the respective anode and cathode (COL 1, lines 15-27/COL 2, line 52 to COL 3, line 5/CLAIM 1/FIGURE 1). *The structure of the channels also encompasses the presence of a plurality of lands.* Gas permeable carbon current collectors 34, 36, 38 and 40 (gas diffusion element) are disclosed (COL 2, line 64 to COL 3, line 2). Additionally, the electrically conductive element (i.e. bipolar/septum 8) presses up against gas permeable carbon current collectors 36 and 38 (COL 3, lines 10-17/ FIGURE 1). *Therefore, the anode sides and cathodes sides of the membrane electrode assembly are in direct contact with the electrically conductive elements 8, 14 and 16 (bipolar septum/plate).*

EMPHASIS ADDED ↓:

Disclosure A: Li et al discloses the formation of an oxide films on the surfaces of the contact elements made from Al or Ti (COL 1, line 65 to COL 2, line 3).

Disclosure B: Li et al also disclose and illustrates bipolar septum/plate 8 or end contact elements 14 and 16 comprising a core 50 of a metal such as Al or Ti; a barrier/protective layer 52 of a metal which forms a passivating oxide film being deposited on the core 50, and is cover with a topcoat of Ti-nitride 54 (COL 3, lines 17-33). More importantly, disclosed therein is that the Ti-nitride topcoat is a micro-discontinuous coat having a plurality of defects therein exposing said protective coating to a corrosive operating environment (CLAIM 1 & CLAIM 3)

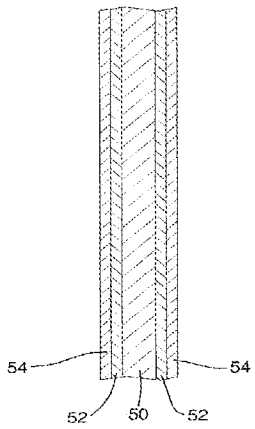


FIG. 2

As evident from **Disclosure A** above, conventional fuel cells have an oxide film on the surfaces of the contact elements made from Al or Ti. *Thus, the contact elements have thereon a film made of either Al-oxide or Ti-oxide.*

As further evident from **Disclosure B** above, the micro-discontinuous Ti-nitride topcoat has a plurality of defects therein exposing the barrier/protective metal layer 52 to the electrodes.

Thus, one way or another, ***Disclosure A*** *or* ***Disclosure B****, alone or in combination, fully support having a non-ferrous metal-oxide coating in direct contact with the gaseous reactants and the electrode part of the membrane electrode assembly.*

Concerning claims 3, 15 and 58:

Contact element is made of either Al or Ti (COL 1, line 65 to COL 2, line 3); OR bipolar septum/plate 8 or end contact elements 14 and 16 comprise a core 50 of a metal such as Al or Ti (COL 3, lines 17-33). *These metals are susceptible to corrosion*. Passivating oxide film 52 inhibits corrosion (CO 3, lines 23-32) or Al has the ability to passivate against corrosion (COL 3, lines 50-56).

As to claim 12:

Disclosed is the use of a carbon cloth placed between the electrode sides (anode side and cathode side) of the membrane electrode and the bipolar septum/plate or end contact elements (COL 2, line 64 to COL 3, line 3/ COL 3, lines 10-15/ FIGURE 1).

Concerning claims 13 and 18-21:

The pair of electrically conductive elements (bipolar septum/plate 8, or end contact plates 14, 16) contains appropriate channels and openings (reference numeral 18, 20, 22 , 24) therein for distributing the gaseous reactants (i.e. hydrogen and oxidant-air) over the surfaces of the respective anode and cathode (COL 1, lines 15-27/COL 2, line 52 to COL 3, line 5/CLAIM 1/FIGURE 1).

Li et al discloses an electrochemical cell according to the aspects mentioned above. However, the preceding prior art does not expressly disclose the specific fluorine doped tin oxide film.

As to claims 1-2, 14, 22 and 56-57:

Gordon discloses electrically conductive films of tin oxide comprising fluorine (ABSTRACT/COL 1, lines 5-25); fluorine doped stannic oxide (COL 2, lines 38-42). The coating is an electrically conductive coating (COL 1, lines 24-28/COL 2, lines 38-42) finding application in electrochemical systems or environments (COL 1, lines 12-18). The film material also exhibits good match of thermal expansion coefficient (COL 9, lines 33-42). The film includes 1-2.5 % of fluorine (COL 7, lines 10-12). Gordon teaches that the resistivity values obtained for the fluorine-doped metal oxide on substrates are about 10^{-4} ohm-cm (COL 9, lines 32-38).

Examiner's note: since Gordon discloses a fluorine-tin based oxide as a coating material, it is contended that Gordon's coating material inherently possesses the claimed resistivity. Accordingly, products of identical chemical composition can not have mutually exclusive properties, and thus, the claimed property (i.e. the claimed bulk resistance), is necessarily present in the prior art material. It is to be noted that appellant's coating having a resistivity of less than .001 ohm-cm is made of a doped metal oxide composition comprising fluorine-doped tin oxide; and appellant's coating composition is the same as that of Gordon.

"Products of identical chemical composition can not have mutually exclusive properties." A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties appellant discloses and/or claims are necessarily present. In re Spada, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). See MPEP 2112.01 [R-3] Composition, Product, and Apparatus Claims.

In view of the above, it would have been obvious to a person possessing a level of ordinary skill in the field of invention at the time the invention was made to use the specific fluorine doped tin oxide of Gordon in the electrochemical cell of Li et al because Gordon directly teaches that such specific oxide films find application in electrochemical systems or environments due to their high electrical conductivity and suitable thermal expansion coefficient. *Additionally, the teachings of Gordon and Li et al are fully pertinent to one another and the field of appellant's endeavor because Gordon is strictly concerned with providing a suitable electrically conductive layer to reduce electrical resistance in power generating devices such as a solar cell or in electrical devices. Thus, Gordon addresses the same technical difficulties confronted by both Li et al and appellant including a reduction in electrical resistance in*

electrical or power generation applications. In anticipation of appellant's response that there is no specific suggestion or teaching in the references to combine prior art, the examiner responds that a decision of Supreme Court in *KSR International Co. v. Teflex Inc., 550 US, 82 USPQ2d 1385 (2007)* forecloses the argument that a specific teaching, suggestion or motivation is required to support a finding of obviousness. See also recent Board decision *Ex Parte Smith, USPQ2d, slip op. at 20 (Bd. Pat. App. & Interf. June 25, 2007) citing KSR, 82 USPQ2d at 1396.*

4. Claims 1-2 and 55-57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gyoten et al 7005205 in view of Gordon 4146657.

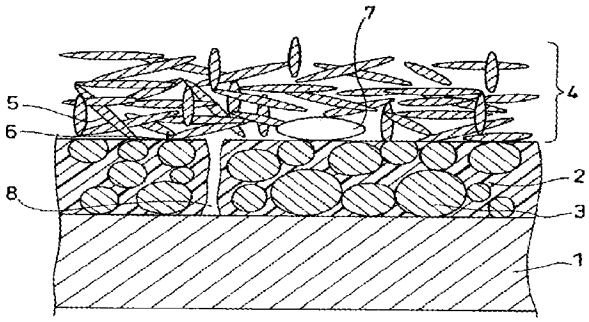
As to claims 1 and 55:

Gyoten et al disclose a polymer electrolyte fuel cell (*same as proton exchange membrane fuel cell*) having an electrolyte membrane electrode assembly having a polymer electrolyte membrane, and a pair of gas-diffusion electrodes sandwiching the polymer electrolyte membrane (ABSTRACT & COL 1, lines 15-25), and further comprising first and second electro-conductive separators having a metal substrate and an electroconductive resin layer thereon and contacting the electrolyte membrane assembly (ABSTRACT/COL 3, lines 19-26). Gyoten et al disclose the inclusion of an electro-conductive separator for affixing the MEA, and interconnecting in series neighboring MEAs having gas-supplying channels for the fuel gas and the oxidant gas to the gas-diffusion electrodes (COL 1, lines 29-34). *The structure of the channels also encompasses the presence of a plurality of lands.*

1st approach: it is imperative to note that the electroconductive resin layer incorporates therein an electroconductive particulate substance (COL 4, lines 5-15) and powders of metal

oxide such as Ru-oxide are effective as the electroconductive particulate substance (COL 4, lines 15-21). As depicted in **Figure 1** below, electro-conductive particles 3 are dispersed in the electroconductive resin layer 2 and direct contact gas diffusion electrode 4 (See Figure 1/ COL 6, lines 12-30). *Thus, Ru-metal oxide particles directly contact the electrode 4.*

FIG. 1



2nd approach: Additionally, there is embodied in Embodied Example 6 having a metal oxide layer between the metal substrate and the resin layer (EMBODIED EXAMPLE 6, COL 8, lines 35-52). *The electrically conductive property of the metal oxide film is inherent to the composition itself.* Gyoten et al teach that the oxide layer is situated between the metal substrate 1 and said electroconductive resin layer 2 (COL 8, lines 48-52/CLAIM 2). Notice also the presence of pin-hole 8 and gas diffusion electrode 4 (See FIGURE 1/COL 6, lines 12-30). *Given that pin-hole 8 directly provides an open path therebetween, it can be said that reactant gas diffusing through gas diffusion electrode also diffuses through the electroconductive resin layer 2. Therefore, said reactant gas contacts or communicates with the oxide layer placed between the metal substrate 1 and said electroconductive resin layer 2.*

Gyoten et al discloses an electrochemical cell according to the aspects mentioned above. However, the preceding prior art does not expressly disclose the specific fluorine doped tin oxide film.

As to claims 1-2 and 56-57:

Gordon discloses electrically conductive films of tin oxide comprising fluorine (ABSTRACT/COL 1, lines 5-25); fluorine doped stannic oxide (COL 2, lines 38-42). The coating is an electrically conductive coating (COL 1, lines 24-28/COL 2, lines 38-42) finding application in electrochemical systems or environments (COL 1, lines 12-18). The film material also exhibits good match of thermal expansion coefficient (COL 9, lines 33-42). The film includes 1-2.5 % of fluorine (COL 7, lines 10-12). Gordon teaches that the resistivity values obtained for the fluorine-doped metal oxide on substrates are about 10^{-4} ohm-cm (COL 9, lines 32-38).

Examiner's note: since Gordon discloses a fluorine-tin based oxide as a coating material, it is contended that Gordon's coating material inherently possesses the claimed resistivity. Accordingly, products of identical chemical composition can not have mutually exclusive properties, and thus, the claimed property (i.e. the claimed bulk resistance), is necessarily present in the prior art material. It is to be noted that appellant's coating having a resistivity of less than .001 ohm-cm is made of a doped metal oxide composition comprising fluorine-doped tin oxide; and appellant's coating composition is the same as that of Gordon.

"Products of identical chemical composition can not have mutually exclusive properties." A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties appellant discloses and/or claims are

necessarily present. In re Spada, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). See MPEP 2112.01 [R-3] Composition, Product, and Apparatus Claims.

In view of the above, it would have been obvious to a person possessing a level of ordinary skill in the field of invention at the time the invention was made to use the specific fluorine doped tin oxide of Gordon in the electrochemical cell of Gyoten et al because Gordon directly teaches that such specific oxide films find application in electrochemical systems or environments due to their high electrical conductivity and suitable thermal expansion coefficient. *Additionally, the teachings of Gordon and Gyoten et al are fully pertinent to one another and the field of appellant's endeavor because Gordon is strictly concerned with providing a suitable electrically conductive layer to reduce electrical resistance in power generating devices such as a solar cell or in electrical devices. Thus, Gordon addresses the same technical difficulties confronted by both Gyoten et al and appellant including a reduction in electrical resistance in electrical or power generation applications.* In anticipation of appellant's response that there is no specific suggestion or teaching in the references to combine prior art, the examiner responds that a decision of Supreme Court in *KSR International Co. v. Teflex Inc., 550 US, 82 USPQ2d 1385 (2007)* forecloses the argument that a specific teaching, suggestion or motivation is required to support a finding of obviousness. See also recent Board decision *Ex Parte Smith, USPQ2d, slip op. at 20 (Bd. Pat. App. & Interf. June 25, 2007) citing KSR, 82 USPQ2d at 1396.*

5. Claims 4-12 and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al 5624769 in view of Gordon 4146657 as applied to claim 1 above, and further in view of Appellant's Admitted Prior Art (heretofore 'the AAPA').

Li et al and Gordon are both applied, argued and incorporated herein for the reasons expressed above.

As to claims 9-10:

Li et al discloses the formation of an oxide films on the surfaces of the contact elements made from Al or Ti (COL 1, line 65 to COL 2, line 3). Li et al also disclose and illustrates bipolar septum/plate 8 or end contact elements 14 and 16 comprising a core 50 of a metal such as Al or Ti; a barrier/protective layer 52 of a metal which forms a passivating oxide film being deposited on the core 50(COL 3, lines 17-33).

As to claim 11:

As to the method limitation, i.e. the welded or braised metal sheet, it is noted that a method limitation incorporated into a product claim does not patentable distinguish the product because what is given patentably consideration is the product itself and not the manner in which the product was made. Therefore, the patentability of a product is independent of how it was made.

However, the preceding prior art does not expressly disclose the specific particle-binder matrix or graphite-filler-matrix substrates; and the specific conductive open cell foam layer.

As to claims 4-5 and 12:

The AAPA discloses that substrate forming the contact element comprises an electrically conductive composite material being a polymer having conductive powder embedded therein, wherein the conductive particles are typically graphite carbon or metal (*Appellant's specification at paragraphs 0076*). Further disclosed is the inclusion of one or more layers disposed between

the coating and the substrate, or the substrate itself having multiple layers (*Appellant's specification at paragraphs 0075).*

As to claims 6-8 and 16-17:

The AAPA mentions the use of a bipolar plate featuring a thin barrier sheet including foam and having a thickness which is being attached by welding or brazing; and forming fluid flow fields. Such a foam has opposed surfaces, is electrically conductive; it can be prepared as metal foams or carbon-based graphite foams (*Appellant's specification at paragraph 0077*).

In view of the above, it would have been obvious to a person possessing a level of ordinary skill in the field of invention at the time the invention was made to use the specific particle-binder matrix or graphite-filler-matrix substrates of the AAPA in the electrochemical cell of Li et al and Gordon as the AAPA discloses such specific substrates enhance electrical contact between the composite element and the next adjacent fuel cell element. Thus, electrical conductivity and contact is improved.

With respect to the specific conductive open cell foam layer, it would have been obvious to a person possessing a level of ordinary skill in the field of invention at the time the invention was made to use the specific conductive open cell foam layer of the AAPA in the electrochemical cell of Li et al and Gordon as the AAPA teaches that such a foam layer forms an electrically conductive element. Thus, electrical conductivity and contact is improved.

(10) Response to Argument

Appellant's arguments including Exhibits A and B filed 07/13/09 have been fully considered but the Examiner remains unpersuaded.

At the outset, in response to appellant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). It bears noting that the rejections above rely upon a combination of primary references with a secondary reference. In addition to that, it is imperative to note that the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. (*Emphasis Added*→) Rather, the test is ***what the combined teachings of the references*** would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

In this regard, it is noted that secondary reference Gordon'657 directly discloses ***electrically conductive films*** of fluorine-doped tin oxides; that various metal oxides such as SnO_2 , among others, have been the ***mostly widely used materials*** for forming electrically conductive coatings and layers; and that said layers/coatings are useful as electrodes or in electrochemical-based cells and many other types of electronic devices (Abstract/ COL 9, lines 33-39/COL 1, lines 24-30 & 6-18/ COL 2, lines 37-42/COL 7, lines 9-11). It is noted that a fuel cell is an electrochemical cell and an electronic device by virtue of its capacity to generate power or electricity and current flow.

Note that Gordon'657 emphasizes that the disclosed coating material exhibits high electrical conductivity (COL 2, lines 38-42). Thus, because the coating material of Gordon'657 shows high electrical conductivity it must have a sufficiently low resistivity.

Gordon'657 also emphasizes that the good match between thermal expansion coefficients of tin-oxides and the substrate material allows deposition of thick layers without significant strains (COL 9, lines 31-38). Thus, the teaching of Gordon'657 is suggestive enough to arrive at the conclusion that there is a good matching or surface compatibility between the coating material and the substrate. Concerning this matter, a careful review of independent claims 1 and 55 reveals that appellant's electrically conductive contact element (the element where the claimed electrically conductive coating is deposited) is not materially undefined. That is, the material used to make appellant's electrically conductive contact element (i.e. substrate) is unknown and broadly claimed. As such, the teachings of the combined prior art reads on and fully satisfies the claimed invention because there is disclosed, collectively, an electrically conductive contact element having deposited thereon a doped-metal oxide as instantly claimed.

Appellant's arguments appear to create a double standard for examination because both of the main appellant's features crucial for patentability as critically argued by the applicant (*i.e. the electrically conductive contact element and the doped metal oxide composition*) are materially undefined and broadly claimed (i.e. claiming a large number of materials with no specific material composition in the present claims) but, at the same time, appellant advances arguments against the prior art based on the specific materials disclosed therein. In other words, appellant takes the position to claim his invention in a broadly manner and without specifying the materials ultimately intended in independent claims 1 and 55; nonetheless, appellant provides unsupported reasons against the combination of references grounded on their specifics. However, in the end, appellant is overlooking the fact that the prior art of record, as applied in combination,

fully circumscribes the requirement of having an electrically conductive contact coated with a doped-metal oxide as instantly claimed.

In the appellant's declaration, in arguing the compatibility or incompatibility of the coating layer with the substrate, appellant has failed to provide objective, sound or scientific evidence by virtue of reasonable experimentation, or results published in technical literature, as applicable, to show or demonstrate the presence of deleterious, detrimental or catastrophic effects when the coating layer of Gordon'657 is combined with any one of the substrates of Li et al'769 and Gyoten et al'205. The burden of proof is on the appellant. On a related note, in item 17 of appellant's declaration (Exhibit A), appellant made the statement that "*The technical problem we confronted includes providing a conductive layer on* ***a metallic substrate***...", however, as simple as it is, no metallic substrate is presently claimed or recited in independent claims 1 and 55. Thus, such a statement is not commensurate in scope with the claimed invention, and does not represent, in any manner, an accurate description of the invention recited in independent claims 1 and 55.

With respect to Exhibit B, it should be noted that there are more than one acceptable definition or meaning for each of the terms argued by the appellant (i.e. "cover", "contiguous" and/or "coat"). Now using the same copies of the dictionary pages provided by the appellant, notice that each term may have ***various*** meanings carrying different interpretations or connotations. That is to say, not one of the argued terms appears to have a unique, sole, concrete, exclusive and/or single meaning or definition. Therefore, the examiner is under the impression that appellant is "*selectively picking-and-choosing*" [*sic*] how the contended terms should be interpreted in the absence of a definition in the disclosure. Since the as-filed specification does

not provide a clear, precise and concrete definition for each term, appellant's picking-and-choosing of the meaning(s) of each term is merely subjective, ungrounded and without merit.

For the reasons expressed in the immediately preceding paragraphs, it is found that the teachings of Gordon'657 are pertinent and fully applicable to primary references Li et al'769 and Gyoten et al'205. Thus, both rejections under Section 103 are sustainable.

With respect to appellant's arguments that the prior art of record shows "separate", "discrete", and "sporadic deposits" of layers instead of "*an electrically conducting coating deposited on and contiguously covering said plurality of lands of said major working surface...*", the examiner simply contends that appellant continues to conveniently overlook that appellant's lands are separated or spaced apart from each other by an open space or a physical distance. As such, even though the meaning of the terms "contiguously", "cover", and/or "coat" has been noted as articulated by the appellant, the examiner verily believes that appellant's invention is far from reciting in a verbatim manner what appellant now appears to be arguing i.e. "*appellant submit claims 1 and 55 recite a coating that is spread over the lands in an unbroken sequence*". In short, the examiner disagrees with appellant's characterization that terms "contiguous" and "cover" in the context of the invention are equivalent to the foregoing citation. The contrast between both appellant's recited language and appellant's defined language is stark. With all due respect, appellant is encouraged to avoid introducing unclaimed limitations based upon meanings and definitions conveniently accommodated by the appellant. The duty of the examiner is to examine the invention based on the language recited in the present claims, not the plethora of potential implications of each and every definition of each and every claim terminology. Also, it is noted that plain meaning consistent with the as-filed specification, state-of-the-art and current

meaning of the term has been given to the words of the claim. Unfortunately, appellant's as-filed specification does not provide a clear definition for each and every term currently recited in the claims in question; ipso facto, the examiner must try to interpret such a language based on the state-of-the-art of the claimed invention, and/or definitions from a reliable and accurate source such as a dictionary.

With respect to appellant's argument concerning the lack of reasons for combining the references (Gordon, Li et al and Gyoten et al) as proposed in the rejection above, the examiner stands by his position, arguments and comments. Ample explanation of why it is reasonable to combine all of the cited references in the manner expressed hereinabove has been provided, advanced and articulated by the examiner in prior office actions, and is offered again hereinbelow. Therefore, appellant should refer to any item infra and supra addressing so.

With respect to the channels and their respective lands, Li et al'769 teach a pair of electrically conductive elements (bipolar septum/plate 8, or end contact plates 14, 16) serving as current collectors for the anode/cathode and containing appropriate channels and openings therein for distributing the gaseous reactants (i.e. hydrogen and oxidant-air) over the surfaces of the respective anode and cathode (COL 1, lines 15-27/COL 2, line 52 to COL 3, line 5/CLAIM 1/FIGURE 1). *The structure of the channels also encompasses the presence of a plurality of lands.* Gas permeable carbon current collectors 34, 36, 38 and 40 (gas diffusion element) are disclosed (COL 2, line 64 to COL 3, line 2). Additionally, the electrically conductive element (i.e. bipolar/septum 8) presses up against gas permeable carbon current collectors 36 and 38 (COL 3, lines 10-17/ FIGURE 1). Therefore, the anode sides and cathodes sides of the membrane electrode assembly are in direct contact with the electrically conductive elements 8,

14 and 16 (bipolar septum/plate). Similarly, Gyoten et al'205 disclose the inclusion of an electro-conductive separator for affixing the MEA, and interconnecting in series neighboring MEAs having gas-supplying channels for the fuel gas and the oxidant gas to the gas-diffusion electrodes (COL 1, lines 29-34). *The structure of the channels also encompasses the presence of a plurality of lands.*

In response to appellant's argument that the references are nonanalogous art, it has been held that a prior art reference must either be in the field of appellant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the appellant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, the examiner has explained in detail how pertinent one reference is to the other, see rejections supra and discussion infra. In this respect, appellant is kindly reminded that a recitation of an invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

With respect to the term "*contiguous*", it bears noting that its meaning within the claimed invention is not very clear because such a term only means "adjacent", "neighboring", "bordering", "adjoining" or the like but it does not further limit the claims to have a "*continuous*" coating "*fully*" covering the plurality of lands as apparently argued by the appellant. Since the prior of record discloses segmented coating portions, it can be said that those portions still read on appellant's claimed invention. And in light of a specific dimension associated with the length of the claimed coating, it is practically impossible to ascertain the intended structural impact of

the so claimed limitation "contiguously" covering. Unless the term is defined in the specification, there is currently no reasonable definition of how such a limitation should be construed in the context of the claimed invention.

As far as appellant's arguments related to the "fuel cell" where appellant has contended that the preamble to the claims contains the language "fuel cell", the examiner does not fully comprehend what is the point of raising such an argument because both primary references are strictly related to FUEL CELLS. For instance, the substance of the Li et al'769 disclosure openly and clearly discloses fuel cell systems. The same goes for Gyoten et al'205. Therefore, it should be vehemently clear that there is no reason to argue that the prior art of record, alone, singly, together or in combination does not teach, disclose, suggest, and/or show fuel cells. This point is not well-taken by the examiner.

With regard to the claiming of unexpected results, those unexpected results are not truly representative of the claimed invention, and thus, they are not commensurate with the scope of the present subject matter. As such, appellant's assertion of unexpected results have been re-evaluated but still found ineffective to overcome the prima facie case of obviousness as set forth above. For instance, in the declaration dated 02/21/08, appellant discusses "*a bipolar plate assembly*", "*fuel cell*", "*metallic substrate*", "*PEM membrane*" and specific "*doping level*" and attributes certain unexpected results to embodiments/fuel cell system comprising the same. FINE. However, a close examination of the present claims pronouncedly reveals that the present claims clearly omit most of these features and/or elements. Therefore, no unexpected result can be attributed to appellant's electrochemical cell as instantly claimed because it does not contain the same elements/features found to impart unexpected results to the embodiment or fuel cell

system described in the foregoing declaration. Thus, appellant's secondary evidence of non-obviousness is not commensurate in scope with the present claims. In other words, the specific structural and material embodiment exhibiting the so-called unexpected results does not fully circumscribe the invention in question. Thus, it cannot be said that the invention in question is also capable of possessing those superior characteristics.

In response to appellant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the appellant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

The basis of appellant's traversal appears to be premised on three principal points:

(a) "*it would not be obvious to combine the teachings of Gordon with either Li et al or Gyoten et al*" ("*there is no motivation to combine the teachings of Gordon with either Li et al or Gyoten et al*") especially now that "*Amended claims 1 and 55 recite structure for a PEM fuel cell...*" and based on appellant's seven (7) comments made in the paragraph bridging pages 16-17 of the 06/12/08 amendment;

(b) "*replacing the sporadic deposits disclosed by Li et al and Gyoten et al with the composition disclosed by Gordon does not yield a coating which covers major working surface of the contact element*";

(c) "*replacing the barrier protective layer disclosed by Li et al and Gyoten et al does not yield a coating which has a substantial portion of the coating in direct contact with a reactant gas*".

In reply to point (a): in response to appellant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. (*Emphasis added*) Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). Additionally, in response to appellant's arguments that there is no specific suggestion or teaching in the references to combine prior art, the examiner responds that a decision of Supreme Court in *KSR International Co. v. Teflex Inc., 550 US, 82 USPQ2d 1385 (2007)* forecloses the argument that a specific teaching, suggestion or motivation is required to support a finding of obviousness. See also recent Board decision *Ex Parte Smith, USPQ2d, slip op. at 20 (Bd. Pat. App. & Interf. June 25, 2007) citing KSR, 82 USPQ2d at 1396.*

With respect to "*structure for a PEM fuel cell*", the prior art of record fully meets the requirement of showing a proton exchange membrane fuel cell. Li et al disclose a PEM (proton

exchange membrane) fuel cell (Abstract); and Gyoten et al disclose a polymer electrolyte fuel cell (*same as proton exchange membrane fuel cell*) having an electrolyte membrane electrode assembly having a polymer electrolyte membrane (ABSTRACT & COL 1, lines 15-25)

In reply to point (b): to better understand the implication of that limitation, let's take a closer look at what the present claims recite: (claims 1 and 55) "*having an electrically conductive coating deposited on and covering said major working surface*". As seen in the preceding sentence, the recitation only requires that the coating covers said major working surface but it does not stipulate whether the covering is in-part (partly or partially or just a portion) or in-full (fully or in its entirety). Thus, it is the position of the examiner that the foregoing limitation does not put forth that the "***entire*** *surface of said major working surface is covered by the coating*" as apparently argued by the appellant. In addition, all transitional phrases in independent claims 1 and 55 are open-ended, and DO NOT exclude various possibilities such an embodiment "*having an electrically conductive coating deposited on and* ***partially or partly*** *covering said major working surface*". The Examiner's position is not unreasonable in view of appellant's amendment to claims 1 and 55, few lines below, where appellant intends to claim subject matter in terms of a part or a portion (in part, portion, partially) and/or entirety (entire, all). The examiner is making reference to the limitation "*substantial portion*".

With respect to the extent of the surface covered by the coating, it is helpful to note that both primary references (Li et al and Gyoten et al) teach that "*the barrier protective layer is exposed to the reactant gas through discontinuities or pinholes in the topcoat layer*" wherein the "*discontinuities or pinholes in the topcoat layer"* indeed represent appellant's "*covered portion*". Consequently, the discontinuities or pinholes in the topcoat layer of both Li et al and Gyoten et al

fully account for substantial portions in contact with the reactant gas. Interestingly, appellant's arguments (see page 15 of the 06/12/08 amendment, last full paragraph) appears to be an admission on the record that Li et al and Gyoten et al disclose that "*the barrier protective layer is exposed to the reactant gas through discontinuities or pinholes in the topcoat layer*".

Appellant has substantially maintained the line of arguments previously advanced, and have questioned the validity of the teachings of Gordon et al simply because Gordon et al does not disclose what appellant calls a fuel cell environment. Well, the fact is that appellant neither claims a fuel cell system. At most, appellant's invention is related to an electrochemical cell per se (see appellant's claims). While the teachings of Gordon may appear to be irrelevant for the appellant it should be noted that Gordon et al has been cited by the Examiner for teaching that fluorine doped tin oxide films can be used in electrochemical systems or environments as instantly claimed. Therefore, Gordon et al is of technical importance for those skilled in the art seeking to coat or deposit a layer an electrically conductive contact element. Therefore, it is well to note that Gordon directly teaches the use of specific oxide films in electrochemical systems and/or applications due to their high electrical conductivity and suitable thermal expansion. Regardless of the intended use of Gordon et al films, the technical fact is that Gordon et al expressly communicate their intent to use the fluorine doped tin oxide films for coating surfaces of electrochemical components. That is how the Examiner is interpreting the teachings of Gordon et al.

Appellant has contended the Examiner's statement concerning how pertinent Gordon et al and Li are to each other and the field of appellant's endeavor. However, appellant appears to side with the Examiner's position as appellant does admit that "*Gordon may be concerned with*

providing a suitable electrically conductive layer to reduce electrical resistance in power generating devices such as a sola cell or the like" (See amendment dated 02/21/08 paragraph bridging pages 16-17). In this respect, because Gordon et al show such a characteristic, it can be said that Gordon et al is suitable for any other power generating device comprising a unit cell such as a fuel cell.

In response to appellant's argument that the references fail to show certain features of appellant's invention, it is noted that the features upon which appellant relies (i.e., bipolar *plate, fuel cell*) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Appellant has contended that "*The applications to which Gordon is directed, namely solar cells and photoelectrochemical cells, are no reasonably pertinent to the field of PEM fuel cells*", "*The technical difficulties presented by the PEM fuel cell of appellant's invention are substantially different from the technical difficulties addressed by the Gordon reference*", "*The knowledge possessed by one skill in the art of PEM fuel cells and the prior art, including the art relied on by the Examiner, teach away from the Appellant's use of metal oxides in the bipolar plate of a fuel cell*" and "*The metal oxide layer claimed by Appellants does not merely perform the same function as the metal oxide layer disclosed by Gordon but produces results unexpected of metal oxide layers*". In sum, appellant appears to be questioning the grounds of rejection based solely upon the pertinence of one reference with respect to the other. Nevertheless, appellant is respectfully reminded that in response to appellant's argument that there is no specific suggestion or teaching in the references to combine prior art, a decision of Supreme Court in

KSR International Co. v. Teflex Inc., 550 US, 82 USPQ2d 1385 (2007) forecloses the argument that a specific teaching, suggestion or motivation is required to support a finding of obviousness. See also recent Board decision Ex Parte Smith, USPQ2d, slip op. at 20 (Bd. Pat. App. & Interf. June 25, 2007) citing KSR, 82 USPQ2d at 1396. The Examiner's position concerning the applicability of the KSR legal decision prevails for the reasons of record.

All the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention. Stated differently, combining prior art elements according to known methods to yield predictable results is prima-facie obvious. *KSR International Co. v. Teleflex Inc., 550 US- 82 USPQ2d 1385, 1396 (2007). The predictable result is the high conductivity and good matching of thermal expansion coefficient offered by Gordon's film made of the fluorine doped tin oxide.*

The present claims are obvious because the technique for improving a particular class of devices was part of the ordinary capabilities of a person of ordinary skill in the art, in view of the teaching of the technique for improvement in other situations. Stated differently, use of known technique to improve similar devices (methods, or products) in the same way is prima-facie obvious. *KSR International Co. v. Teleflex Inc., 550 US- 82 USPQ2d 1385, 1396 (2007). The improvement is the high conductivity and good matching of thermal expansion coefficient offered by Gordon's film made of the fluorine doped tin oxide.*

The present claims are obvious because a particular known technique was recognized as part of the ordinary capabilities of one skilled in the art. Stated differently, applying a known

technique to a known device (methods or product) ready for improvement to yield predictable results is prima-facie obvious. *KSR International Co. v. Teleflex Inc., 550 US- 82 USPQ2d 1385, 1396 (2007). The predictable result is the high conductivity and good matching of thermal expansion coefficient offered by Gordon's film made of the fluorine doped tin oxide.*

The present claims are obvious because a person of ordinary skill in the art would have been motivated to combine the prior art to achieve the claimed invention and that there would have been a reasonable expectation of success. Stated differently, some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention renders the claimed invention prima-facie obvious. *KSR International Co. v. Teleflex Inc., 550 US- 82 USPQ2d 1385, 1396 (2007).* It is thus obvious to one of ordinary skill in the art to include the fluorine-doped tin oxide disclosed in the Gordon reference in the electrochemical cell (fuel cell) of either the Li et al or the Gyoten et al reference to achieve the claimed invention. As disclosed in the Gordon reference, the fluorine-doped tin oxide film (coating) exhibits good electrical conductivity and good match of thermal expansion coefficient. Thus, the motivation for the combination would be to increase conductivity and better match thermal expansion coefficient.

Moreover, the teachings of Gordon and Li et al or Gyoten et al are fully pertinent to one another and the field of appellant's endeavor because Gordon is strictly concerned with providing a suitable electrically conductive layer to reduce electrical resistance in power generating devices such as a solar cell or in electrical devices. Thus, Gordon addresses the same technical difficulties confronted by both Li et al or Gyoten et al and appellant including a reduction in electrical resistance in electrical or power generation applications.

Since Gordon discloses a fluorine-tin based oxide as a coating material, it is contended that Gordon's coating material inherently possesses the claimed resistivity. Accordingly, products of identical chemical composition can not have mutually exclusive properties, and thus, the claimed property (i.e. the claimed bulk resistance), is necessarily present in the prior art material. It is to be noted that appellant's coating having a resistivity of less than .001 ohm-cm is made of a doped metal oxide composition comprising fluorine-doped tin oxide; and appellant's coating composition is the same as that of Gordon. Therefore, Gordon's film composition necessarily exhibits the same degree of resistivity.

"Products of identical chemical composition can not have mutually exclusive properties." A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties appellant discloses and/or claims are necessarily present. In re Spada, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). See MPEP 2112.01 [R-3] Composition, Product, and Apparatus Claims.

- MPEP 2112.01 [R-3] Composition, Product, and Apparatus Claims:

I. PRODUCT AND APPARATUS CLAIMS — WHEN THE STRUCTURE RECITED IN THE REFERENCE IS SUBSTANTIALLY IDENTICAL TO THAT OF THE CLAIMS, CLAIMED PROPERTIES OR FUNCTIONS ARE PRESUMED TO BE INHERENT.

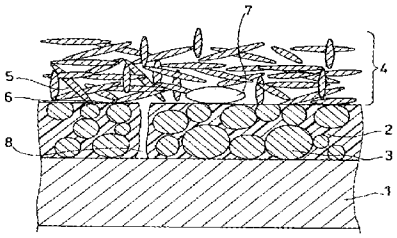
Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established. In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). "When the PTO shows a sound basis for believing that the products of the appellant and the prior art are the same, the appellant has the

burden of showing that they are not." In re Spada, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

With respect to appellant's arguments that Gyoten et al'205 do not disclose the claimed invention:

1st approach: in this respect, (*emphasis supplied→*) it is imperative to note that electroconductive resin layer 2 incorporates therein an electroconductive particulate substance (COL 4, lines 5-15) and powders of metal oxide such as Ru-oxide are effective as the electroconductive particulate substance (COL 4, lines 15-21). As depicted in Figure 1 below, electro-conductive particles 3 are dispersed in the electroconductive resin layer 2 and direct contact gas diffusion electrode 4 (See Figure 1/Col 6, lines 12-30). *Thus, Ru-metal oxide particles directly contact the electrode 4.*

FIG. 1



2nd approach: In addition to that, appellant has articulated that the reference "*fails to teach a metal oxide coating in communication with a reactant gas*". Interestingly, appellant has admitted that "*The oxide layer, being sandwiched between the substrate and the resin layer, prevents contact between the oxide layer and the reactant gas*" (See amendment dated 11/03/06 at page 16, last sentence of 2nd full paragraph). This appellant's statement or admission contributes to the position taken by the examiner because the oxide is formed on the surface of the metal substrate 1 facing the gas diffusion electrode 4. Accordingly, reactant gas diffuses

through pinhole 8 in the resin layer 2 and contacts the oxide layer deposited between the resin layer 2 and the metal substrate 1. Since the oxide layer prevents contact between the reactant gas and the metal substrate, it can be said that the oxide layer is acting as a direct barrier therebetween. Meanwhile, the oxide layer per is in direct contact with the reactant gas, and therefore in communication therewith.

Stated alternatively, Gyoten et al teach that the oxide layer is situated between the metal substrate 1 and said electroconductive resin layer 2 (COL 8, lines 48-52/CLAIM 2). Notice also the presence of pin-hole 8 and gas diffusion electrode 4 (See FIGURE 1/COL 6, lines 12-30). Given that pin-hole 8 directly provides an open path therebetween, it can be said that reactant gas diffusing through gas diffusion electrode also diffuses through the electroconductive resin layer 2. Therefore, said reactant gas contacts or communicates with the oxide layer placed between the metal substrate 1 and said electroconductive resin layer 2.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Raymond Alejandro/

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